



<p>(51) International Patent Classification ⁶ : C12N 15/12, C07K 14/78, C12N 15/70, 1/21</p>	<p>A3</p>	<p>(11) International Publication Number: WO 98156915</p> <p>(43) International Publication Date: 17 December 1998 (17.12.98)</p>
<p>(21) International Application Number: PCT/US98/12099</p> <p>(22) International Filing Date: 12 June 1998 (12.06.98)</p> <p>(30) Priority Data: 60/049,410 12 June 1997 (12.06.97) US</p> <p>(71) Applicant: RESEARCH CORPORATION TECHNOLOGIES, INC. [US/US]; Suite 600, 101 North Wilmot Road, Tucson, AZ 85711-3335 (US).</p> <p>(72) Inventor: KOIDE, Shohei; 236 Oakdale Drive, Rochester, NY 14618 (US).</p> <p>(74) Agent: VIKSNINS, Ann, S.; Schwegman, Lundberg, Woessner & Kluth, P.O. Box 2938, Minneapolis, MN 55402 (US).</p>		<p>(81) Designated States: AU, CA, JP, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</p> <p>88) Date of publication of the international search report: 4 March 1999 (04.03.99)</p>

(54) Title: ARTIFICIAL ANTIBODY POLYPEPTIDES

NdeI 1 11 21 31 41 **PstI** **EcoRI**
 mq VSDVPRDLEV VAATPTSLII SWDAPAVTVR YYRITYGETG GNSPVQEEFTV
 A B C D
 SacI **SacI** **XhoI**
 51 61 71 81 91
 PGSKSTATIS GLKPGVDYTI TVYAVTGRGD SPASSKPISTI NYRT
 E F G

(57) Abstract

A fibronectin type III (Fn3) polypeptide monobody, a nucleic acid molecule encoding said monobody, and a variegated nucleic acid library encoding said monobody, are provided by the invention. Also provided are methods of preparing a Fn3 polypeptide monobody, and kits to perform said methods. Further provided is a method of identifying the amino acid sequence of a polypeptide molecule capable of binding to a specific binding partner (SBP) so as to form a polypeptide:SSP complex, and a method of identifying the amino acid sequence of a polypeptide molecule capable of catalyzing a chemical reaction with a catalyzed rate constant, k_{cat} , and an uncatalyzed rate constant, k_{uncat} , such that the ratio of k_{cat}/k_{uncat} is greater than 10.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

1. CLASSIFICATION OF SUBJECT MATTER IPC 6 C12N15/12 C07K14/78 C12N15/70 C12N1/21		
according to International Patent Classification (IPC) or to both national classification and IPC		
3. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) EPC 6 C07K C12N		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)		
2. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	K. ELY ET AL.: "Common molecular scaffold for two unrelated RGD molecules." PROTEIN ENGINEERING, vol. 8, no. 8, August 1995, pages 823-827, XP002088954 Oxford, GB see the whole document ---	1,2,4-6
A	A. MAIN ET AL.: "The three-dimensional structure of the tenth type III module of fibronectin: An insight into RGD-mediated interactions." CELL, vol. 71, no. 4, 13 November 1992, pages 671-678, XP002088955 Cambridge, MA, USA cited in the application see the whole document --- -/--	1-39
a Further documents are listed in the continuation of box C. <input type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
Date of the actual completion of the international search 29 December 1998		Date of mailing of the international search report 14/01/1999
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Nooij, F

INTERNATIONAL SEARCH REPORT

Internat Application No

PCT/US 98/12099

(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	<p>S. KOIDE ET AL.: "Directed evolution of fibronectin type III domain to novel ligand binding proteins." THE FASEB JOURNAL, vol. 11, no. 9, 31 July 1997, page A837 XP002088956 Bethesda, MD, USA see abstract M40</p> <p>---</p>	1-39
P, X	<p>S. KOIDE ET AL.: "Directed evolution of fibronectin type III domain to novel ligand binding proteins." THE FASEB JOURNAL, vol. 11, no. 9, 31 July 1997, page A1155 XP002088957 Bethesda, MD, USA see abstract 1739</p> <p>-----</p>	1-39